The MiniBooNE Primary Beamline

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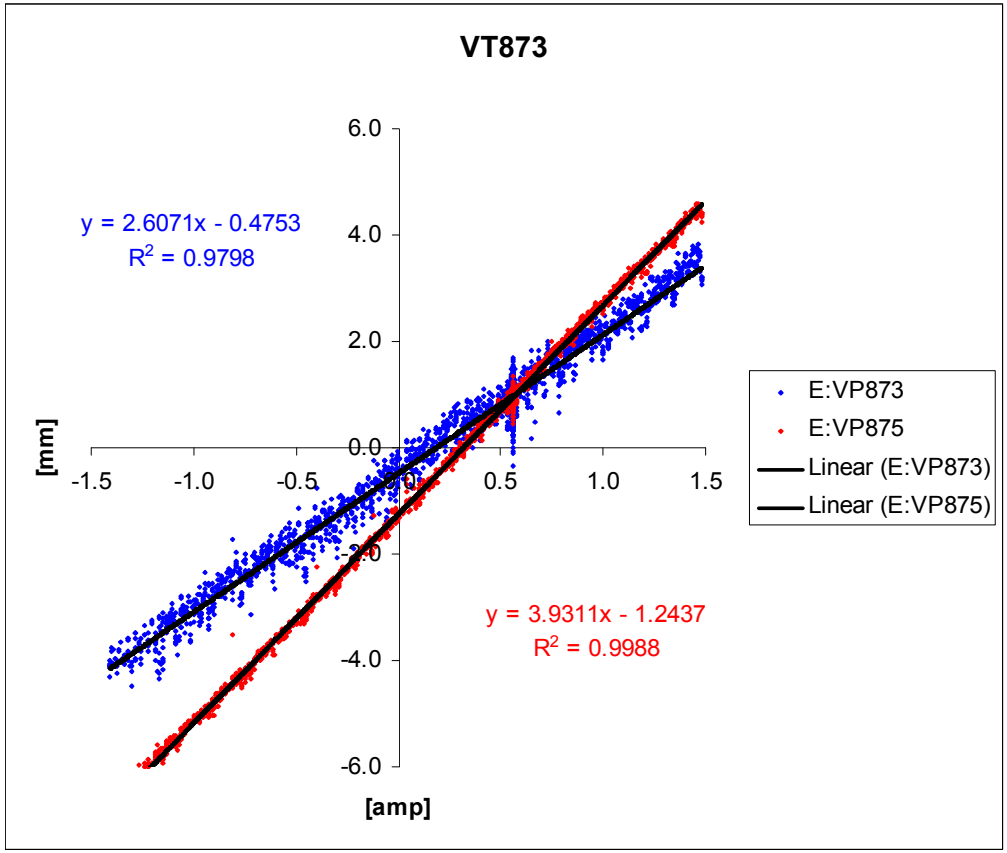
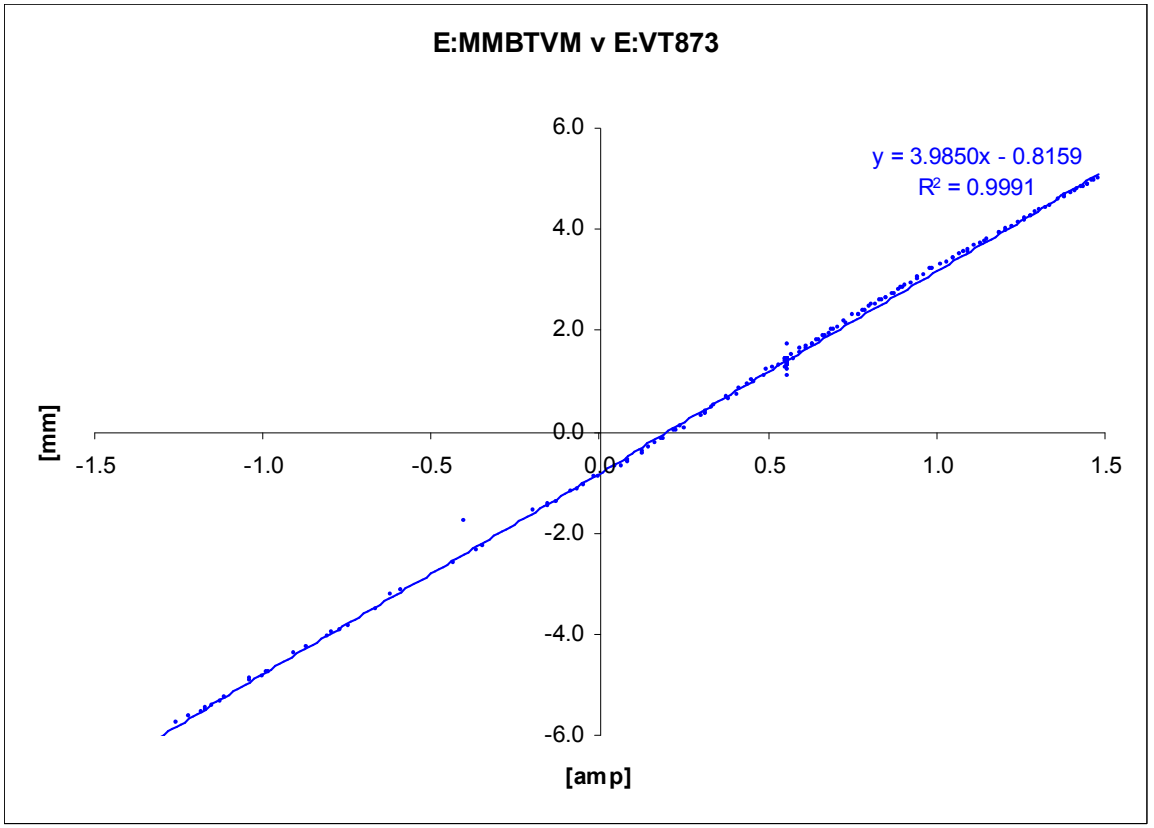
Lattice Measurement

- Vary trim magnets, one at a time.
- Measure the response at each beam position monitor (BPM) and multwire MW).
- Compare the measured and predicted response functions.
- Adjust quadrupole constatns as needed.

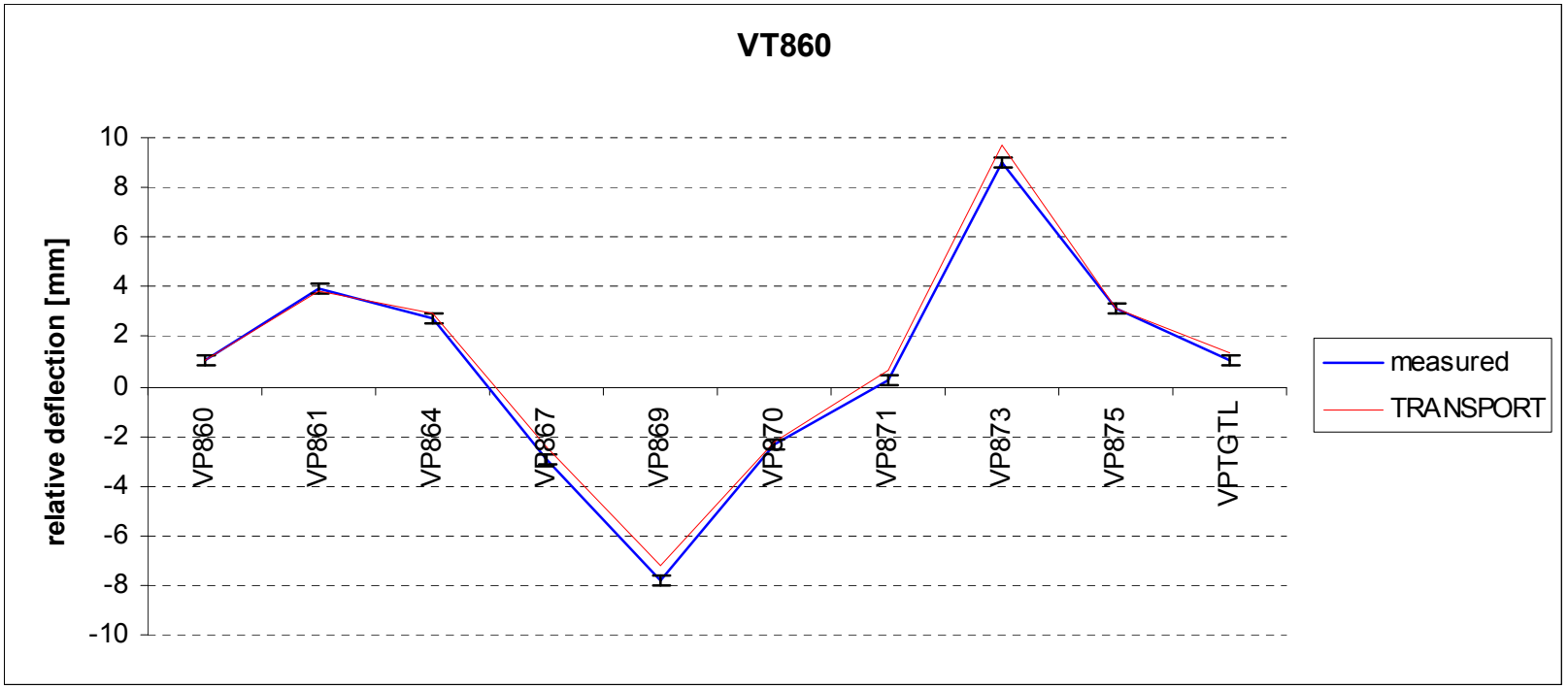
Linearity of Kick at Beam Position Monitors



Linearity of Kick at Multiwire



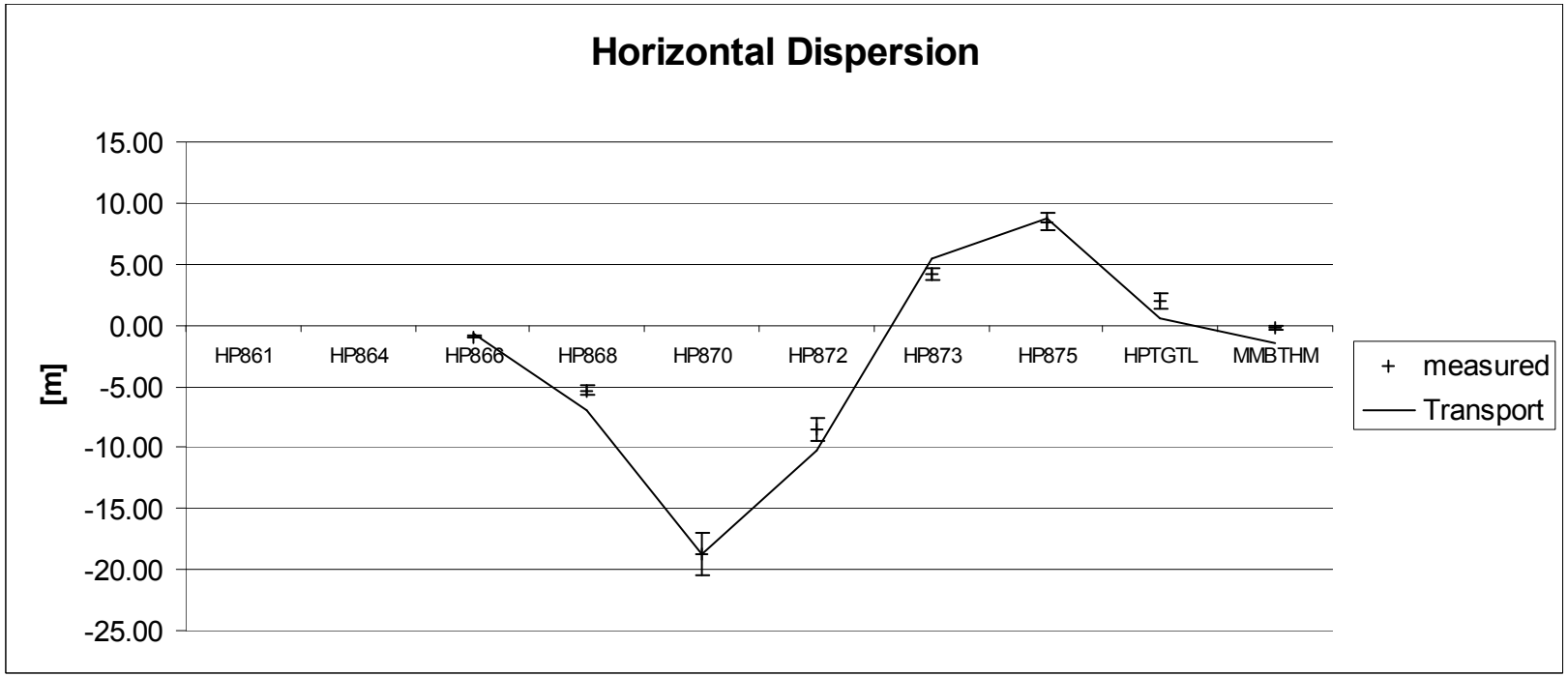
Example Measurement of Response Function



Independent Measurement of Dispersion

- Insert a thin foil of know thickness into beamline.
- This changes the beam momentum by a known amount.
- Downstream beam position changes due to momentum mismatch.
- Measurements are compared with predictions.

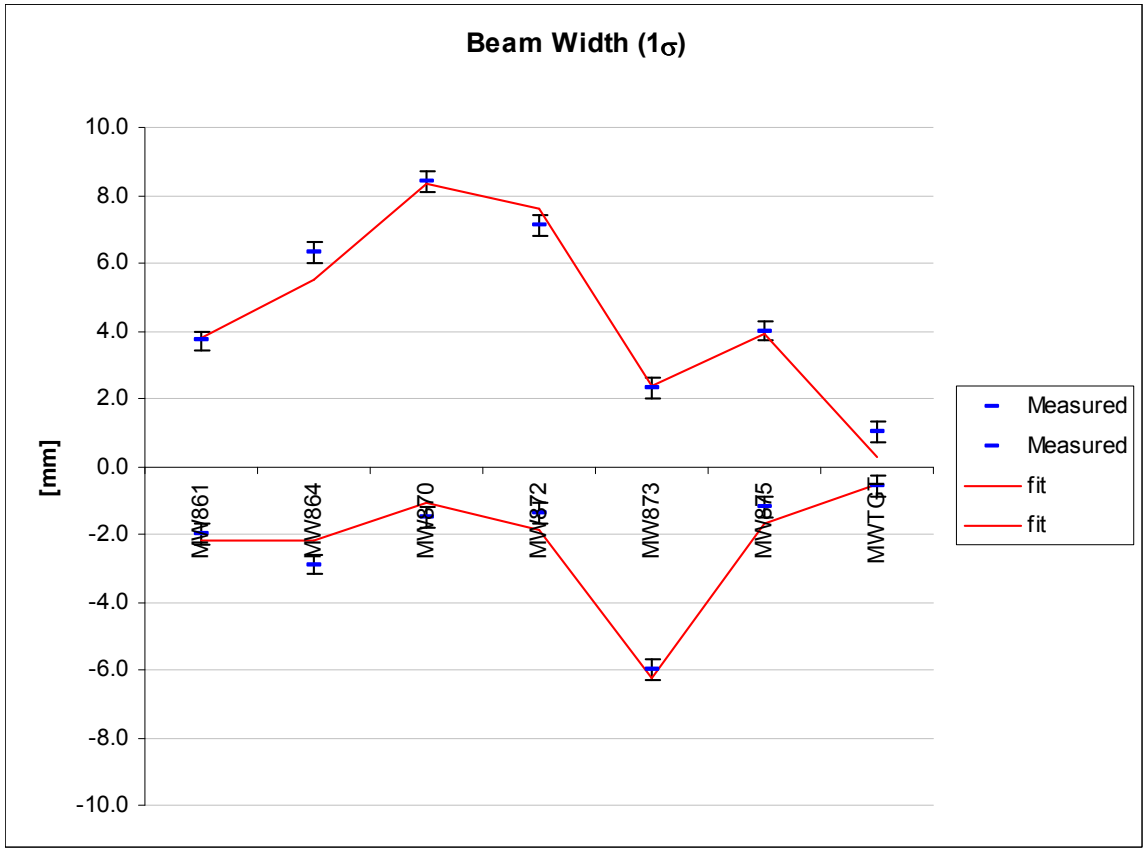
Measured Dispersion



Phase Space Measurement

- Once the lattice is understood, use measurements of beam width of deduce initial phase space of beam.
- Measure beam profile at multiple locations.
- Vary initial phase ellipse to fit data.

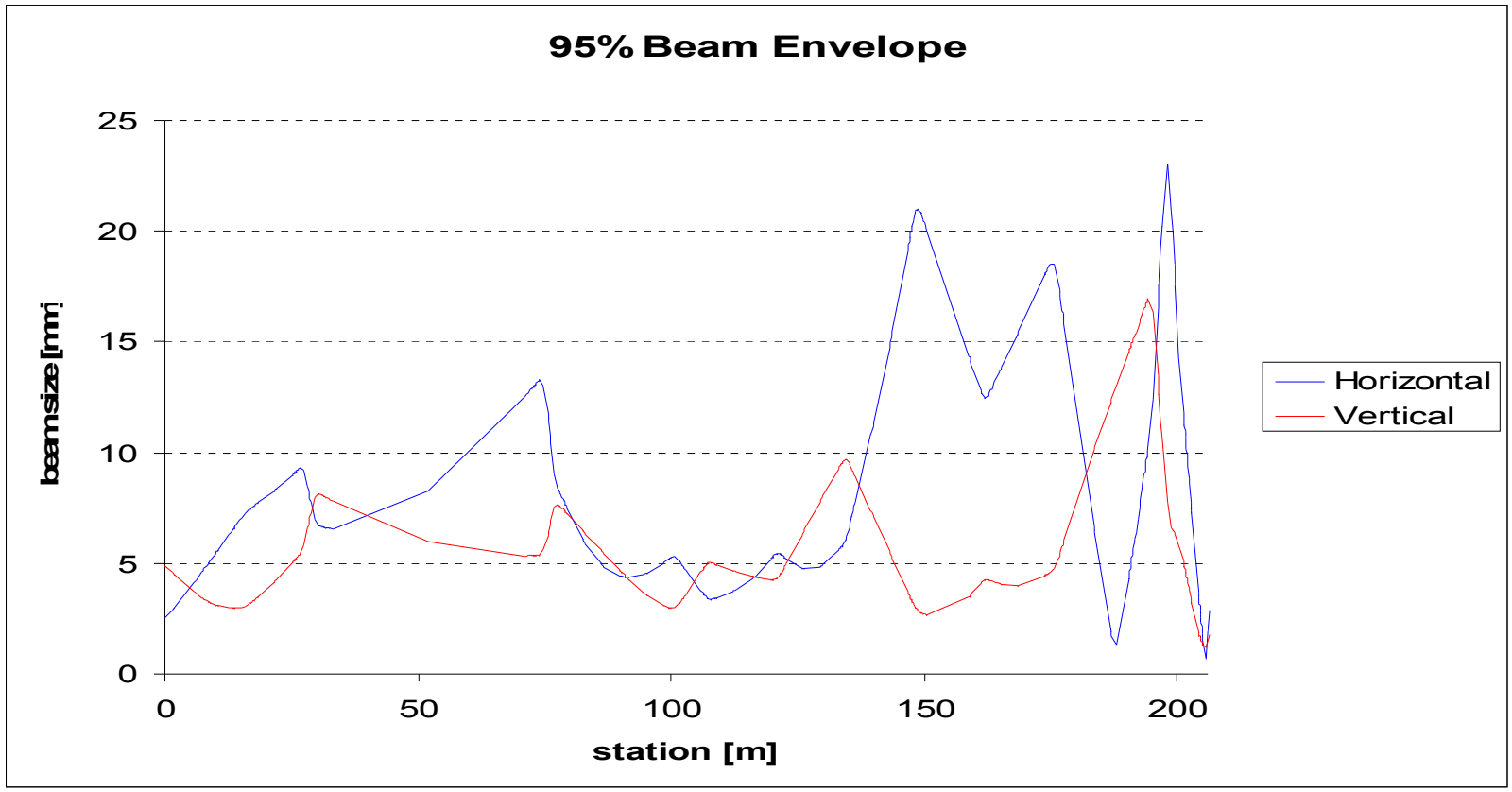
Fit to Beam Width



Final Model

- Once the lattice and initial phase ellipse are known, the beam may be propagated to any location along the beamline.
- The "Aperture Figure of Merit" used in EBD is:
  FOM = [aperture – width(95%)]/[2*width(1σ)]

Beam Envelope



Aperture FOM